ABSTRACT OF THE DISCLOSURE

Reconfiguration of parasitically controlled elements in a phased array is used to expand the range of operational functions. Embedded array elements can be frequency tuned, and bandwidth can be improved by using reconfiguration to broaden the bandwidth of the embedded elements. For high gain arrays, beam squint can be a limiting factor on instantaneous bandwidth. Reconfiguration can alleviate this problem by providing control of the element phase centers. Scan coverage can be improved and scan blindness alleviated by controlling the embedded antenna patterns of the elements as well as by providing control of the active impedance as the beam is scanned. Applying limited phase control to the elements themselves can alleviate some of the complexity of the feed manifold. A presently preferred method of designing reconfigurable antennas is to selectively place controlled parasitic elements in the aperture of each of the antenna elements in the phased array. The parasitic elements can be controlled to change the operational characteristics of the antenna element. The parasitic elements are controlled by either switching load values in and out that are connected to the parasitic elements or are controlled by applying control voltages to variable reactance circuits containing devices such as varactors. The parasitic elements can be controlled by the use of a feedback control subsystem that is part of the antenna system which adjusts the RF properties of the parasitic components based on some observed metric. The controllable characteristics include directivity control, tuning, instantaneous bandwidth, and RCS.